Amendments to the Claims

1-25. (Cancelled).

26. (New) A method of operating a communication system, the method comprising:

receiving at least four first digital data bits in a transmitter system;

entering the at least four first digital data bits into a first data structure to yield a first amplitude value and a second amplitude value;

generating an encoded analog signal cycle based on the first amplitude value and the second amplitude value;

transmitting the encoded analog signal cycle from the transmitter system over a link to a receiver system;

receiving the encoded analog signal cycle over the link in the receiver system;

processing the encoded analog signal cycle to detect a maximum peak amplitude and a minimum peak amplitude from the encoded analog signal cycle; and

entering the maximum peak amplitude and the minimum peak amplitude into a second data structure to yield at least four second digital data bits.

27. (New) The method of claim 26 wherein the transmitter system comprises a central office and the receiver system comprises a customer premises.

28. (New) The method of claim 27 wherein the link between the transmitter system and the receiver system comprises a twisted-pair copper wire.

29. (New) The method of claim 26 further comprising:

transmitting maximum amplitudes from the transmitter system to the receiver system;

receiving the maximum amplitudes in the receiver system; and

adjusting the second data structure based on the maximum amplitudes.

30. (New) The method of claim 26 wherein:

the first data structure correlates the at least four first digital data bits with the first amplitude value and the second amplitude value; and

the second data structure correlates the at least four second digital data bits with the maximum peak amplitude and the minimum peak amplitude.

31. (New) A communication system, comprising:

a transmitter system configured to receive at least four first digital data bits, enter the at least four first digital data bits into a first data structure to yield a first amplitude value and a second amplitude value, generate an encoded analog signal cycle based on the first amplitude value and the second amplitude value, and transmit the encoded analog signal cycle over a link; and

a receiver system coupled to the transmitter system by the link and configured to receive the encoded analog signal cycle over the link, process the encoded analog signal cycle to detect a maximum peak amplitude and a minimum peak amplitude from the encoded analog signal cycle, and enter the maximum peak amplitude and the minimum peak amplitude into a second data structure to yield at least four second digital data bits.

32. (New) The communication system of claim 31 wherein the transmitter system comprises a central office and the receiver system comprises a customer premises.

33. (New) The communication system of claim 31 wherein the link between the transmitter system and the receiver system comprises a twisted-pair copper wire.

34. (New) The communication system of claim 31 wherein:

the transmitter system is configured to transmit maximum amplitudes to the receiver system; and

the receiver system is configured to receive the maximum amplitudes and adjust the second data structure based on the maximum amplitudes.

35. (New) The communication system of claim 31 wherein:

the first data structure correlates the at least four first digital data bits with the first amplitude value and the second amplitude value; and

the second data structure correlates the at least four second digital data bits with the maximum peak amplitude and the minimum peak amplitude.

36. (New) The communication system of claim 31 wherein the transmitter system comprises:

a digital data encoding system configured to generate the encoded analog signal cycle based on the first amplitude value and the second amplitude value; and

a transmitter configured to transmit the encoded analog signal cycle over the link to the receiver system.

37. (New) The communication system of claim 36 wherein the digital data encoding system comprises field programmable gate arrays (FPGA).

38. (New) The communication system of claim 36 wherein the digital data encoding system includes the first data structure stored on an erasable programmable read only memory (EPROM).

39. (New) The communication system of claim 31 wherein the receiver system comprises:

a receiver configured to receive the encoded analog signal cycle over the link; and

a digital data decoding system configured to process the encoded analog signal cycle to detect the maximum peak amplitude and the minimum peak amplitude from the encoded analog signal cycle, and enter the maximum peak amplitude and the minimum peak amplitude into the second data structure to yield at least four second digital data bits.

40. (New) The communication system of claim 39 wherein the digital data decoding system comprises field programmable gate arrays (FPGA).

41. (New) The communication system of claim 39 wherein the digital data decoding system includes the second data structure stored on an erasable programmable read only memory (EPROM).